Facility:	Davis-Besse		Scenario No.: 1	Op Test No.:	NRC 2005
Examiners:			Operators:		
Initial Conditions:	• 80% power, MOL				
	• AFPT #1 tagged OOS.				
	• Containment Air cooler (CAC) #1 tagged OOS				
	• CAC-3 is aligned for Train 1				
Turnover:	Hold at 80% power while the Reactor Engineer reviews the calorimetric calculation completed at the end of the last shift.				

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	TS-SRO	AO reports oil leak on Train 1 Containment Spray Pump.
2	RCP-07	C-RO, SRO	RCP 1st Stage Seal failure on RCP 1-1.
3		R-RO N-SRO TS-SRO	Power reduction prior to stopping RCP 1-1.
4	RCS-10	I-RO, BOP, SRO	RCS Hot Leg RTD slowly drifts HI.
5	RCP-01	M-ALL	RCP 1-2 Breaker trips. Reactor Trip required.
6	RPS-01	C-RO	AUTO and MANUAL Reactor trip fails.
7	PZR-01	M-ALL	PZR Safety Valve fails OPEN, initiating SFAS.
8	HPI-02, 03	C-RO	HPIP 1 trips. HPIP 2 fails to automatically start.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

DAVIS-BESSE 2005 NRC EXAM SIMULATOR SCENARIO 1 GENERAL DESCRIPTION

The crew will take the watch with power holding at 80% power while the Reactor Engineer reviews the calorimetric calculation completed at the end of the last shift.

On cue from the Lead Evaluator, an AO will call the control room to report an oil leak on Containment Spray (CS) Pump #1. The SRO should request assistance from maintenance and/or enter the applicable TS. If necessary, a maintenance supervisor will report that the pump must be tagged OOS in order to make the repairs.

After the SRO has declared the TS for the CS Pump, the Lead Evaluator can cue the RCP 1-1 seal failure. The crew should respond to alarm 6-3-A in accordance with DB-OP-02006, REACTOR COOLANT PUMP ALARM PANEL 6 ANNUNCIATORS, and then enter DB-OP-02515, REACTOR COOLANT PUMP AND MOTOR ABNORMAL OPERATION. DB-OP-02515 will require the crew to reduce power to ≤72% in accordance with DB-OP-02504, RAPID SHUTDOWN, and stop the affected RCP. The SRO should enter the proper TS after the RCP is stopped.

On cue from the Lead Evaluator, the RCS Thot selected on HIS3A and for “Tave” or “UNIT” will begin to drift HI. The crew should respond to alarm 4-2-B or indications in accordance with DB-OP-02004, REACTOR COOLANT ALARM PANEL 4 ANNUNCIATORS. The affected controls should be shifted to an alternate channel and the channel should be removed from service. The channel does not have to be removed from service to proceed with the scenario.

The Lead Evaluator can cue RCP 1-2 breaker trip when evaluation on the Thot failure is complete. The crew should recognize that an AUTO reactor trip should have occurred and attempt to initiate a MANUAL reactor trip. This will fail and the RO should initiate a reactor trip by momentarily de-energizing Busses E2 and F2. Coincident with the reactor trip a PZR Safety Valve will fail sufficiently open to cause an SFAS actuation. HPIP #1 will trip and HPIP #2 will fail to automatically start. The crew should enter DB-OP-02000 - RPS, SFAS, SFRCS TRIP, OR S/G TUBE RUPTURE, and, among other actions, perform the following high level activities: verify the reactor is tripped, start HPIP #2, complete the actions for lack of adequate subcooling margin.

The Lead Evaluator can terminate the scenario when all high level activities have been completed and the evaluators agree the crew can be properly evaluated.

Op Test No.: 1	Scenario # 1	Event # 1	Page 3 of 17
Event Description: AO Reports Oil Leak On Train 1 Containment Spray Pump			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **Call the control room to report an oil leak on Containment Spray Pump #1**		
	SRO	Refers to Tech Spec LCO 3.6.2.1.
	RO/BOP	Manually energize CS pump 1 blue light.
	SRO	May Call Field Supervisor.
	SRO	May Call Work Week Manager.
	SRO	May refer to Risk Matrix (Yellow 5.2).
At Lead Evaluator's discretion, proceed to Event 2		

Op Test No.: 1	Scenario # 1	Event # 2 & 3	Page 4 of 17
Event Description:	RCP 1st Stage Seal Failure on RCP 1-1; Power Reduction Prior to Stopping RCP 1-1		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, insert command for Event 2**		
Indications Available: **(6-3-A) 1-1 SEAL RET FLOW HI.** **High controlled bleedoff flow of RCP 1-1 seal water.**		
	Crew	Respond to Annunciator Alarm (6-3-A) 1-1 SEAL RET FLOW HI.
	RO	Observe High controlled bleedoff flow of RCP 1-1.
	SRO	Refer to DB-OP-02515, Reactor Coolant Pump and Motor Abnormal Operation.
	CREW	Determine IF any of the following RCP conditions exist:
		• Seal Return Temp ≥ 200°F
		• Total seal leakage for the affected RCP ≥ 2.0 gpm.
		• Seal stage pressure drop greater than 1440 PSIG.
	CREW	Determines total seal leakage is > 2.0 gpm.
	CREW	IF a Reactor Shutdown to take the Unit off line is NOT desired, THEN, perform those steps necessary to reduce reactor power to the desired power level, AND REFER TO Attachment 1, Plant Stabilization at a Lower Power Level.
		IF four RCPs are in operation, THEN perform the following:

Op Test No.: 1	Scenario # 1	Event # 2 & 3	Page 5 of 17
Event Description:	RCP 1st Stage Seal Failure on RCP 1-1; Power Reduction Prior to Stopping RCP 1-1		

Time	Position	Applicant's Actions or Behavior
	RO	a. Reduce reactor power to 72 percent.
	RO	b. Stop the affected RCP.
	BOP	c. Verify proper Feedwater flow ratios of 2.4 to 1.
	RO/BOP	d. Verify Tave control transferred to the RC loop with two RCPs.
	CREW	e. Verify RCS flow is greater than the flow required by T.S. 3.2.5.
	SRO	Within four hours verify the Ø/ΔØ/Flow AND High Flux Trips setpoints have been reduced in accordance with TS 3.4.1.1.
	SRO	Notify the Steam Control Center (SCC). Load dispatcher of the unit load reduction.
		As determined by the Unit Supervisor, reduce unit load by any of the following methods:
		• At the LOAD CONTROL panel:
	RO	1. Set the RATE OF CHANGE to a rate specified by the Unit Supervisor.
	RO	2. Set the MIN LIMIT – MW to 180 Mwe.
	RO	3. Depress the DEC pushbutton to lower the unit load to the target determined by the Unit Supervisor.

Op Test No.: 1	Scenario # 1	Event # 2 & 3	Page 6 of 17
Event Description:	RCP 1st Stage Seal Failure on RCP 1-1; Power Reduction Prior to Stopping RCP 1-1		

Time	Position	Applicant's Actions or Behavior
	RO	IF the APSRs are available, THEN attempt to maintain Axial Power Imbalance between 0 and negative 10 percent.
	SRO	Request Chemistry to perform the following:
		• Monitor Condensate Polisher operation.
At Lead Evaluator's discretion, proceed to Event 4		

Op Test No.: 1	Scenario # 1	Event # 4	Page 7 of 17
Event Description:	RCS Hot Leg RTD Slowly Drifts HI		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
When directed, insert command for Event 4		
Indications Available:		
4-2-B, HOT LEG TEMP HIGH		
14-4-D, ICS FW LIMITED BY RX POWER		
14-4-E, ICS INPUT MISMATCH		
14-6-D, ICS IN TRACK		
4-2-E, PZR LVL LO		
Loop 2 Thot indication rising		
	RO	Check the alarm by observing Loop 1 and Loop 2 Hot Leg Tis.
	RO	Verify the ICS is reducing Rx power to lower Tave to 582°F
	RO	Compare Hot Leg Temperature Indicators TI RC3A1 and T1 RC3B1 on RC Panel C5718.
	Crew	Respond to Annunciator Alarm (4-2-E) PZR LVL LO
	RO	Observes Low Pressurizer level as indicated on LRS RC14 on Control Room Panel C5706.
	RO	Check Pressurizer level low on LRS RC14 on Control Room Panel C5705.
	RO	IF Pressurizer Level is due to a Tave transient, THEN perform the following:
		a. Reduce MU-32 Setpoint to ~ 180".

Op Test No.: 1 Scenario # 1 Event # 4 Page 8 of 17

Event Description: RCS Hot Leg RTD Slowly Drifts HI

Time	Position	Applicant's Actions or Behavior
		b. WHEN Tave is restored to ~ 582°F, AND Pressurizer Level is stable, THEN restore MU-32 to 220 inches as directed by the CTRM SRO.
	CREW	Determine which instrument pair has caused the alarm. (Thot)
	BOP	Place SP6A, FEEDWATER MAIN VALVE, HVA Station in HAND.
	BOP	Place BOTH FEEDWATER DEMAND H\A Stations in HAND.
	BOP	Verify FW601, S/G 2 MAIN FEEDWATER STOP VALVE, is open.
	BOP	Maintain Feedwater flow matched with Plant power using SP6A and SP7A AND LOOP 1 FEEDWATER DEMAND H\A Station.
	BOP	Verify Main Feedwater Pump(s) OR the Motor Driven Feed Pump is in service.
	RO/BOP	Check for ICS module, component, or instrument failures.
At Lead Evaluator's discretion, proceed to Event 5		

Op Test No.: 1	Scenario # All	Event # 5, 6, 7, & 8	Page 9 of 17
Event Description:	RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, insert command for Event 5**		
Indications Available: **5-3-H, RPS POWER – PUMPS TRIPPED** **5-1-G, H, I, J, RPS CH 1, 2, 3, 4 TRIPPED** **ZL4265A and ZL 4265A red lights lit – Safety Valve Open indication**		
	RO	Manually Trip the Reactor.
		Reactor Trip Pushbutton has been depressed;
		AND
		Power is decreasing on the Intermediate Range Nuclear Instrumentation (NO).
		IF the reactor is NOT shutdown, THEN perform the following actions until the reactor is shutdown.
		• Manually deenergize the CRDs in the order listed below:
CRITICAL TASK	**RO**	**1. Momentarily deenergize 480-Volt Unit Substations E2 AND F2 simultaneously.**
		• Maintain balanced primary to secondary heat transfer:
		1. IF MFW is less than Reactor power, THEN manually control MFW flow to match Reactor power.
	RO	Manually trip the Turbine.

Op Test No.: 1 Scenario # All Event # 5, 6, 7, & 8 Page 10 of 17

Event Description: RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start

Time	Position	Applicant's Actions or Behavior
		Turbine Trip Pushbutton has been depressed.
		AND
		Turbine Stop Valves 1, 2, 3 AND 4 are closed.
		OR
		Turbine Control Valves 1, 2, 3, AND 4 are closed.
	SRO	CHECK FOR SPECIFIC RULE OR SYMPTOM DIRECTION
		Implement any necessary Specific Rules.
		ACTIONS FOR LOSS OF SUBCOOLING MARGIN Applies Specific Rule 2
		MU\HPI\LPI FLOW INITIATION, THROTTLING, AND TERMINATION Applies Specific Rule 3
	SRO	Implement any necessary Symptom Mitigation Sections
		LACK OF ADEQUATE SUBCOOLING MARGIN Applies
	SRO	Directs tripping remaining RCP's IAW specific Rule 2 when subcooling is lost.

Op Test No.: 1 Scenario # All Event # 5, 6, 7, & 8 Page 11 of 17

Event Description: RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start

Time	Position	Applicant's Actions or Behavior
CRITICAL TASK	**RO**	**Trips all remaining RCPs**
		MU\HPI Initiation
	RO	Start the standby CCW Pump.
		Start BOTH HPI Pumps.
		• HPI Pump 1 (Tripped)
	RO	• HPI Pump 2
	RO	Open HPI Injection Valves.
		• HP 2A
		• HP 2B
		• HP 2C
		• HP 2D
	RO/SRO	IF only one HPI train is available, THEN REFER TO Attachment 11, HPI Flow Balancing.
	RO	Stop Makeup flow through HPI Train 2 by closing MU 6422, MU CTMT ISOLATION.

Op Test No.: 1	Scenario # All	Event # 5, 6, 7, & 8	Page 12 of 17
Event Description:	RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start		

Time	Position	Applicant's Actions or Behavior
	RO	Verify HPI Train 2 Injection Valves are fully open.
		• HP2A, HIGH PRESSURE INJECTION LINE 2-1 ISOLATION
		• HP2B, HIGH PRESSURE INJECTION LINE 2-2 ISOLATION
	RO	Determine which injection line has the lower flow and REFER TO Figure 3, HPI Balancing.
		• FYI HP3A
		• FYI HP3B
	RO	IF only the lower flow is NOT in the acceptable region, THEN throttle the higher flow line until:
		• The lower flow line is in the acceptable region
		OR
		• The high flow line reaches the lower limit of the acceptable region
		REFER TO Figure 3, HPI Balancing.
	RO	IF MU 6422 was closed in Step 2.a above, THEN open MU 6422, MU CTMT ISOLATION.

Op Test No.: 1 Scenario # All Event # 5, 6, 7, & 8 Page 13 of 17

Event Description: RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start

Time	Position	Applicant's Actions or Behavior
	RO	Monitor RCS Pressure.
	SRO	Routes to DB-OP-02000, section for LACK OF ADEQUATE SUBCOOLING MARGIN
	RO	Trip all RCPs. (Already performed.)
	RO	Verify BOTH HPI Trains are in service as follows:
	RO	Verify BOTH CCW Trains are in service to supply essential cooling:
		• CCW Train 1
		• CCW Train 2
	RO	Verify BOTH HPI Pumps are running.
		• HPI Pump 1 – tripped
		• HPI Pump 2
	RO	Verify HPI Injection Valves fully open.
		• HP 2A
		• HP 2B
		• HP 2C

Op Test No.: 1 Scenario # All Event # 5, 6, 7, & 8 Page 14 of 17

Event Description: RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start

Time	Position	Applicant's Actions or Behavior
		• HP 2D
	RO	Lineup Makeup System as follows:
		Lock MU Pump Suctions in the BWST position.
		• MU 3971
		• MU 6405
	RO	Start the second MU Pump.
	RO	Start BOTH LPI Pumps
		• LPI Pump 1
		• LPI Pump 2
	RO	Open MU 6420, MU 32 BYPASS.
	RO	Verify MU 6422, MU CTMT ISOLATION is open.
		IF LPI Flow into the RCS does not exist, THEN perform the following:
	RO	a. Open BOTH piggyback valves

Op Test No.: 1 Scenario # All Event # 5, 6, 7, & 8 Page 15 of 17

Event Description: RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start

Time	Position	Applicant's Actions or Behavior
		• DH 63
		• DH 64
	RO	b. IF two MU Pumps are running, THEN perform the following:
		• Open MU 6421, CTMT ISOLATION FOR ALTERNATE MU INJECTION LINE
		• Open MU 6419, ALTERNATE MU INJECTION LINE.
	CREW	Verify proper SFAS response.
	BOP	Verify proper SFRCS actuation for the trip parameters present using Table 1.
	BOP	Verify proper SG level control by AFW using Specific Rule 4.
		Isolate Possible RCS Leaks as follows:
	RO	IF MU/HPI PORV Cooling is NOT in progress, THEN perform the following:
		a. Verify RC 2A, PORV, control switch in AUTO.
		b. Close RC 11, PORV BLOCK Valve.
	RO	Verify MU 2B, LETDOWN ISO is closed.

Op Test No.: 1 Scenario # All Event # 5, 6, 7, & 8 Page 16 of 17

Event Description: RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start

Time	Position	Applicant's Actions or Behavior
	RO	Verify RC 2, PZR SPRAY Valve is closed.
	RO	Close RC 10, PZR SPRAY BLOCK Valve.
	RO	Close Pressurizer Sample Isolations
		• RC 239A
		• RC 239B
	RO	Verify Loop 1 High Point Vents are closed.
		• RC 4608A
		• RC 4608B
	RO	Verify Loop 2 High Point Vents are closed.
		• RC 4610A
		• RC 4610B
	RO	Verify CFT Isolation Valves are open.
		• CF 1A
		• CF 1B

Op Test No.: 1 Scenario # All Event # 5, 6, 7, & 8 Page 17 of 17

Event Description: RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start

Time	Position	Applicant's Actions or Behavior
	SRO	If adequate subcooling margin exists, THEN GO TO Step 5.18.
		ADEQUATE SUBCOOLING MARGIN (20 degrees F) HAS BEEN ESTABLISHED
	CREW	Throttle MU and HPI as necessary to maintain adequate subcooling margin. REFER TO Specific Rule 5, PTS Requirements.
Scenario may be terminated when crew reaches Step 5.18.		

Facility:	DAVIS-BESSE	Scenario No.:	2	Op Test No.:	NRC 2005
Examiners:		Operators:			

Initial Conditions:
- 100% power, EOL
- AFPT #1 tagged OOS
- Containment Air Cooler #1 tagged OOS
- CAC #3 is aligned for Train 1

Turnover: Maintain 100% power.

Event No.	Malf. No.	Event Type*	Event Description
1		TS-SRO	SFRCS Power Supply Failure.
2		C-BOP, SRO	Condensate Pump Trip.
3		I-ALL	Steam Pressure Transmitter Failure.
4	CCW-01 CCW-02	C-RO, SRO TS-SRO	CCW Pump trip/failure of AUTO start on standby pump.
5	AC-05	M-ALL	Loss of one 13.8KV Bus.
6	MS-06	C-ALL	One Main Steam Safety Valve fails partially OPEN.
7	SFRCS-02	C-BOP, SRO	Failure of AUTO SFRCS actuation.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

DAVIS-BESSE 2005 NRC EXAM SIMULATOR SCENARIO 2 GENERAL DESCRIPTION

The crew will take the watch with directions to maintain 100% power.

On cue from the Lead Evaluator, an SFRCS power supply failure will occur. The crew will respond to multiple annunciators, check the SFRCS cabinets, and determine that a 28 VDC power supply has failed. The SRO will refer to DB-OP-06406 and Technical Specifications to determine required action.

The Lead Evaluator can cue the Condensate Pump failure any time after the declaration of the SFRCS TS. The crew will respond to annunciators and the BOP will manually throttle CD-420 and 421 to maintain Deaerator level in accordance with DB-OP-02013.

When the plant is stable following the Condensate Pump trip, a Steam header Pressure transmitter will fail, requiring the crew to place the turbine in MANUAL and raise SG pressure, and to place the SG/RX Demand in HAND to stabilize the plant. The crew will refer to DB-OP-06407 for the NNI failure, and DB-OP-06401 to restore ICS to full automatic operation.

Anytime after the plant is stabilized, the Lead Evaluator can cue the trip of a running Component Cooling Water (CCW) Pump. The crew should respond to alarm 11-4-B in accordance with DB-OP-02011, HEAT SINK ALARM PANEL 11 ANNUNCIATORS, and then implement DB-OP-02523, COMPONENT COOLING WATER SYSTEM MALFUNCTIONS. The RO should manually start the standby pump before RCP/reactor trip criteria is met.

After the standby CCW Pump has been started and the non-essential CCW Header isolation valves are closed on the failed pump, the Lead Evaluator can cue the loss of one 13.8KV Bus. This results in a reactor trip and entry into DB-OP-02000. One main steam safety valve will fail partially open and SFRCS will fail to actuate in AUTO. Flow through the main steam safety valve will be limited to avoid SFAS actuation. Among other actions, the crew will perform the following high level activities: actuate SFRCS, perform overcooling actions, and initiate MU/HPI cooling with only one vital bus available.

The Lead Evaluator can terminate the scenario when all high level activities have been completed and the evaluators agree the crew can be properly evaluated.

Op Test No.: 1	Scenario # 2	Event # 1	Page 3 of 13
Event Description: SFRCS Power Supply Failure			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, insert command for Event 1**		
Indications Available: **Multiple SFRCS alarms.**		
	CREW	Responds to alarms.
	CREW	Determines cause is loss of 28 VDC power supply.
	SRO	Refers to DB-OP-06406.
	SRO	Determines T.S. 3.3.2.2 applies.
When Tech Specs have been addressed or at Lead Evaluator's discretion, proceed to Event 2		

Op Test No.: 1	Scenario # 2	Event # 2	Page 4 of 13
Event Description:	Condensate Pump Trip		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, insert command for Event 2**		
Indications Available: **13-2-B CNDS PMP DISCH HDR PRESS** **Low Condensate Pump discharge header pressure as indicated at PI 569, CONDENSATE PUMP DISCHARGE.** **13-4-C DEAR STRG TK 1 LVL** **13-4-D DEAR STRG TK 2 LVL** **High Deaerator Storage Tank 1 and 2 water levels**		
	BOP	Verify the proper number of condensate pumps are on for the unit load. REFER TO DB-OP-06221, Condensate System. Determines one (1) pump tripped.
	BOP	Observes condensate header flow rate as indicated at FI 578, CONDENSATE PUMPS DISCHARGE.
	BOP	May control CD 421 and 420, DEAER STORAGE TANK 1 and 2 CONTROL VALVES, to maintain Deaerator levels.
At Lead Evaluator's discretion, proceed to Event 3		

Op Test No.: 1	Scenario # 2	Event # 3	Page 5 of 13
Event Description:	Steam Pressure Transmitter Failure		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, insert command to initiate Event 3**		
Indications Available: **14-3-F HPT MN STM PRESS**		
	BOP	Transfer turbine to MANUAL.
		Check steam pressure in the Steam Generators:
		• PI SP12B, SG 1 PRESS – Dropping (Inst. Failure).
		• PI SP12A, SG 2 PRESS.
	BOP	Determine the cause of the abnormal Main Steam Line header pressure. (Instrument Fail)
		When plant is stable;
	RO	Verify FIC ICS32B(A), FEEDWATER DEMAND is in AUTO.
	RO	Verify HC ICS20, REACTOR DEMAND is in AUTO.
	RO	Review Attachment 8, HIC ICS 13, SG/RX Demand.
	RO	IF DAAS is available AND it is desired, THEN monitor related DAAS points to minimize the error between the automatic and manual signals. Refer to Attachment 14, Operation of DAAS.
	RO	Verify the error between the POS and MV positions on HIC ICS13, SG/RX DEMAND is as small as possible for the current plant conditions.

Op Test No.: 1 Scenario # 2 Event # 3 Page 6 of 13

Event Description: Steam Pressure Transmitter Failure

Time	Position	Applicant's Actions or Behavior
	RO	Depress and release AUTO on HIC ICS13, SG/RX DEMAND.
	CREW	IF ICS is returned to its normal alignment, THEN verify annunciator (14-6-D) ICS IN TRACK is EXTINGUISHED.
		When plant is stable;
	BOP	Verify the Turbine is synchronized to the grid.
	BOP	Review Attachment 9, PIC ICS 10 Press Control Turb. Throttle Press.
	BOP	Verify PIC ICS 10, HDR PRESSURE CONTROL Setpoint is 45%.
	BOP	IF DAAS is available AND it is desired, THEN monitor related DAAS points to minimize the error between the automatic and manual signals. Refer to Attachment 14, Operation of DAAS.
	BOP	Adjust Turbine load using increase/decrease pushbuttons on HIC 2540, EHC PANEL 1, until PRS SP16, TURBINE THROTTLE PRESS indicates 870 psig.
	BOP	Depress and release LOAD CONTROL SELECTOR ICS IN.
	BOP	Check the ICS IN AND ICS READY lights are lit.

When the plant is stable with ICS stations returned to AUTO and at Lead Evaluator's discretion, proceed to Event 4

Op Test No.: 1	Scenario # 2	Event # 4	Page 7 of 13
Event Description:	CCW Pump Trip/Failure of AUTO Start on Standby Pump		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, insert command to initiate Event 4**		
Indications Available: **6-5-B, SEAL CCW FLOW LOW** **2-3-A, LETDOWN TEMP HIGH** **Letdown Isolation**		
	RO	Verify the standby CCW Pump starts. (FAILS)
	RO	IF the standby CCW Pump fails to start, THEN perform the following:
	RO	IF high temperature computer alarms are received on the RCPs, THEN GO TO Step 4.6.11, OTHERWISE monitor RCP Temperatures.
	RO	Monitor RCS Letdown Temperatures.
CRITICAL TASK	**RO**	**Start the standby CCW pump.** **(Prior to reaching RCP Trip Criteria)**
	CREW	Send an Operator to investigate relay targets on any tripped CCW Pump breakers.
	RO	Verify the Non-Essential CCW Isolation valves open for the running CCW Pump, AND closed for the non-running CCW Pump.
		LOOP 1
		• CC 5095
		• CC 5097

Op Test No.: 1 Scenario # 2 Event # 4 Page 8 of 13

Event Description: CCW Pump Trip/Failure of AUTO Start on Standby Pump

Time	Position	Applicant's Actions or Behavior
		• CC 2645
		LOOP 2
		• CC 5096
		• CC 5098
		• CC 2649
	RO	Return the Letdown System to service, REFER TO DB-OP-06006, Makeup and Purification. (Letdown is isolated.)
	RO	Open MU104, PURIFICATION DEMINERALIZER BYPASS.
	RO	Isolate Purification Demineralizers 1, 2, and 3 by closing the following valves:
		• MU10A, MIXED BED 1 LETDOWN INLET, using HISMU10A.
		• MU10B, mixed bed 2 LETDOWN INLET, using HISMU10B
		• MU1903, PURIFICATION DEMIN 3 LETDOWN FLOW INLET, using HISMU1903.
	RO	Manually override the high temperature signal by holding the following valves in the OPEN position, until the trip clears:

Op Test No.: 1 Scenario # 2 Event # 4 Page 9 of 13

Event Description: CCW Pump Trip/Failure of AUTO Start on Standby Pump

Time	Position	Applicant's Actions or Behavior
	RO	• MU2B, LETDOWN COOLERS INLET ISOLATION, using HISMU2B
	RO	• MU1A, RC LETDOWN COOLER 1 INLET ISOLATION, using HISMU1B.
	RO	• MU1B, RC LETDOWN COOLER 2 INLET ISOLATION, using HISMU1B
	RO	Restore the Makeup system to the normal valve lineup by opening the following valves as directed by the Shift Manager:
	RO	• MU10A, MIXED BED 1 LETDOWN INLET, using HISMU10A.
		•
	RO	• MU10B, MIXED BED 2 LETDOWN INLET, using HISMU10B.
	RO	• MU1903, PURIFICATIONS DEMIN 3 LETDOWN FLOW INLET, using HISMU1903.
	RO	Close MU104, PURIFICATION DEMINERALIZER BYPASS.
When the standby CCW Pump is running and Letdown has been restored, proceed to Event 5		

Op Test No.: 1 Scenario # 2 Event # 5, 6, & 7 Page 10 of 13

Event Description: Loss of One 13.8KV Bus; One Main Steam Safety Valve Fails Partially OPEN; Failure of AUTO SFRCS Actuation

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, insert command to initiate Event 5**		
Indications Available: **Reactor Trip** **Alarms related to Loss of 13.8 KV Bus A**		
	RO	Manually trip the Reactor.
		Reactor Trip Pushbutton has been depressed.
	RO	Manually trip the Turbine.
		Turbine Trip Pushbutton has been depressed
		AND
		Turbine Stop Valves 1, 2, 3 AND 4 are closed.
		OR
		Turbine Control Valves 1, 2, 3 AND 4 are closed.
		Check for Specific Rule or Symptom Direction
	SRO	Implement any necessary Specific Rules (NONE Apply At This Time)
	RO	Perform Emergency Shutdown of #2 EDG due to loss of cooling

Op Test No.: 1 Scenario # 2 Event # 5, 6, & 7 Page 11 of 13

Event Description: Loss of One 13.8KV Bus; One Main Steam Safety Valve Fails Partially OPEN; Failure of AUTO SFRCS Actuation

Time	Position	Applicant's Actions or Behavior
	SRO	Implement any necessary Symptom Mitigation Sections
	SRO	Determines Section 7 applies (Overcooling).
	CREW	Maintain RCS Inventory as follows:
	RO	Set the PZR level controller to 100 inches.
	RO	Transfer MU Pump suctions to the BWST position AND press OFF for each switch.
		• MU 3971
		• MU 6405
CRITICAL TASK	BOP	Check for SFRCS Actuation. MUST Manually actuate SFRCS due to failure of auto actuation **Isolate AFW flow to the depressurizing OTSG**
	SRO	Determines a failed AVV causing overcooling.
	BOP	Initiate AFW flow AND isolation of BOTH SGs by depressing SFRCS MANUAL ACTUATION switches HIS 6403 AND HIS 6404.
	BOP	Verify proper SFRCS actuation for the trip parameters present.
	CREW	IF an SFRCS Low MS Line Pressure Trip is present OR occurs while performing Steps 7.24 through 7.28, THEN verify proper SFRCS actuation AND GO TO Step 7.29.

Op Test No.: 1 Scenario # 2 Event # 5, 6, & 7 Page 12 of 13

Event Description: Loss of One 13.8KV Bus; One Main Steam Safety Valve Fails Partially OPEN; Failure of AUTO SFRCS Actuation

Time	Position	Applicant's Actions or Behavior
	SRO	IF it is apparent which SG is causing the overcooling, THEN GO TO Step 7.28.
	CREW	Determines OTSG-1 is causing the overcooling condition
	BOP	Take manual control of BOTH AFW level control valves and close BOTH valves.
	BOP	Manually isolate AFW to the steam leak SG by performing one of the following:
	BOP	• IF SG 1 has the steam leak, THEN close AF 608.
	BOP	Verify proper operation of AFW trains feeding the non-isolated SG.
	BOP	Maintain proper SG level in the non-isolated SG with AFW using Specific Rule 4.
	CREW	Check for continued Overcooling with one SG isolated.
	BOP	WHEN the steam leak side SG boils dry (terminating the overcooling), THEN control the AVV on the non-isolated SG to maintain RCS temperature constant or slightly decreasing.
	BOP	AVV H/A Station Operation for the Non-Isolated SG
	BOP	Place the AVV H/A Station in HAND.
	BOP	Reduce the demand to zero.
	BOP	Press the AVV BLOCK pushbutton (HIS-ICS-11C).

Op Test No.: 1 Scenario # 2 Event # 5, 6, & 7 Page 13 of 13

Event Description: Loss of One 13.8KV Bus; One Main Steam Safety Valve Fails Partially OPEN; Failure of AUTO SFRCS Actuation

Time	Position	Applicant's Actions or Behavior
	BOP	Press AUTO on HIS-ICS-11B or HIS-ICS-11A.
	BOP	Control SG pressure as necessary from the H/A Station.
	SRO	Route to Specific Rule 3 when criteria is met.
	RO	When SCM is adequate, throttle MU flow as necessary to observe the following limits:
		• IF MU is piggybacked from LPI, limit MU flow to 275 gpm (motor limitation).
	RO	MU/HPI shall be throttled to prevent exceeding the maximum P/T for cooldown limit line on Figure 1, curve 1.
Terminate scenario when RCS temperature is stable using AFW and OTSG #2 AVV		

Facility:	Davis-Besse		Scenario No.: 3	Op Test No.:	NRC 2005
Examiners:			Operators:		

Initial Conditions:
- 70% power, BOL
- AFPT #1 tagged OOS
- Containment Air Cooler (CAC) #1 tagged OOS
- CAC #3 is aligned for Train 1

Turnover: MFPT #1 has a leak on the inboard bearing supply line. The previous shift initiated a power reduction to take MFPT #1 out of service for repairs. Continue the power reduction and remove MFPT #1 from service.

Event No.	Malf. No.	Event Type*	Event Description
1		N-SRO R-RO	Controlled power reduction
2	MFW-11	C-BOP, SRO	Increasing vibration on MFPT #1 requiring manual trip
3	ICS-02	C-RO, SRO	ICS AUTO Runback fails
4	RCS-13	I-RO, SRO TS-SRO	RCS Pressure instrument selected for NNI input fails LO
5		TS-SRO	120VAC Inverter alarm actuates in the control room
6	SG-01	C-BOP, SRO	OTSG Tube Leak
7	MFW-01	M-ALL	MFPT #2 trips
8	SG-01	C-ALL	OTSG tube leak rises to rupture following the reactor trip
9	PZR-02	C-RO	PZR Spray Valve fails CLOSED during depressurization

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

DAVIS-BESSE 2005 NRC EXAM SIMULATOR SCENARIO 3 GENERAL DESCRIPTION

The crew will take the watch with power holding between 70%. The previous shift initiated a power reduction to take MFPT #1 out of service for repairs. Directions will be to continue the power reduction and remove MFPT #1 from service for repair of an oil leak.

Any time after the power reduction is initiated the Lead Evaluator can cue initiation of rising vibration levels on MFPT #1. The crew should respond to alarm 10-3-A in accordance with DB-OP-02010, FEEDWATER ALARM PANEL 10 ANNUNCIATORS. The Auxiliary Operator (AO) will report a vibration level exceeding the threshold for tripping the pump. The crew should trip MFPT #1, recognize that an AUTO runback did not initiate and then manually runback power to within the capacity of one MFWP.

The Lead Evaluator can cue initiation of failure of the RCS pressure channel selected for NNI input after the plant is stabilized. The crew should respond to alarm 4-4-C in accordance with DB-OP-02004, REACTOR COOLANT ALARM PANEL 4 ANNUNCIATORS. The operator should return the heaters to the correct alignment for the conditions, the channel should be removed from service and the SRO should enter the correct TS. The channel does not have to be removed from service to proceed with the scenario.

Any time after the RCS pressure channel actions are complete, the Lead Evaluator can cue actuation of alarm 1-6-A, INV YV1-YV-3 TRBL. The crew should respond in accordance with DB-OP-02001, ELECTRICAL DISTRIBUTION ALARM PANEL 1 ANNUNCIATORS, and dispatch an AO to investigate. The AO will report that one of the inverters has shifted to the alternate source. The SRO should request maintenance assistance and/or enter the correct TS. If necessary, the maintenance supervisor will report an electrical problem that indicates the normal supply cannot be restored until corrective actions are completed.

Any time after the SRO has entered the TS for the 120VAC problem, the Lead Evaluator can cue initiation of the OTSG tube leak. The crew should respond to alarm 9-4-A in accordance with DB-OP-02009, PLANT SERVICES ALARM PANEL 9 ANNUNCIATORS, which will direct them to DB-OP-02531, STEAM GENERATOR TUBE LEAK, for actions. The simulator operator will maintain leak rate greater than the TS limit but less than DB-OP-02000 entry. After the crew has recognized the tube leak and/or the SRO is evaluating the tube leak TS, the Lead Evaluator can cue the MFPT #2 trip. This results in a reactor trip and entry into DB-OP-02000. After the crew has entered DB-OP-02000, the OTSG tube leak will ramp to a size below SFAS actuation. Among other actions, the crew will perform the following high level activities: establish HPI piggyback operation, depressurize the RCS using pressurizer PORV when the spray valve fails closed.

The Lead Evaluator can terminate the scenario when all high level activities have been completed and the evaluators agree the crew can be properly evaluated.

Op Test No.: 1	Scenario # 3	Event # 1	Page 3 of 25
Event Description: Controlled Power Reduction			

Time	Position	Applicant's Actions or Behavior
		Batch addition of approximately 80 gallons of boric acid.
		Need Reactivity Plan.
		Batching Operations from BAAT's and/or Clean Waste to the Makeup Tank.
		Prerequisites
		Target RCS Boron Concentration _____ ppm.
	RO	Verify the batch size to be added has been calculated and record below:
		____ gallons of + boric acid ____ gallons of = water ____ gallons total batch size
		Notify the CTRM SRO a batch operation to the Makeup Tank is to be performed.
	RO	Verify the Boric Acid Addition Tanks are lined up to provide boric acid to the MU&P System. Refer to DB-OP-06031, Boric Acid Addition Tank Operating Procedure.
	RO	Determine MU 39, BATCH FLOW CONTROL VALVE, position using the following key stroke sequence. Depress and release:
		a. DISPLAY (lower).
		b. VALVE CE (valve is closed)

Op Test No.: 1	Scenario # 3	Event # 1	Page 4 of 25
Event Description: Controlled Power Reduction			

Time	Position	Applicant's Actions or Behavior
	RO	Verify MU 23, FLOW CONTROL, is closed using HC MU 23.
	RO	Verify WC 3526, BOOSTER SYSTEM BYPASS, is closed using HIS 3526.
NOTE:		**Estimating the approximate batch time for the boric acid and water addition serves as a backup method to ensure the batch operation is progressing as expected.**
	RO	Estimate the time required to add the batch. Refer to Limits and Precautions Step 2.1.5.
		$\frac{\text{Gallons of Acid}}{\text{Acid Flowrate}} + \frac{\text{Gallons of Water}}{\text{Water Flowrate}} = \text{Batch Time}$
		_____ min + _____ min = _____ min
	RO	Program Batch Controller batch size calculated in Step 3.1.2 using the following keystroke sequence:
	RO	a. BATCH SET
	RO	b. # keys equating to batch size, in gallons
	RO	c. ENTER
	RO	d. Exit BATCH SET mode by pressing DISPLAY. (lower)
	RO	e. Display batch size in lower display by pressing BATCH 4.

Op Test No.: 1	Scenario # 3	Event # 1	Page 5 of 25
Event Description:	Controlled Power Reduction		

Time	Position	Applicant's Actions or Behavior
	RO	f. IF desired batch size is not indicated in the lower display, THEN repeat Step 3.1.14.a through Step e. above.
	RO	g. Verify the desired batch size is indicated in the lower display.
	RO	Reset the indicated total on the Batch Controller using the following keystroke sequence. Depress and release.
	RO	a. DISPLAY. (lower)
	RO	b. TOTAL 7.
	RO	c. TOTAL RESET 6.
	RO	d. IF indicated total does not go to zero. THEN repeat Steps 3.1.15.a. through c. above.
	RO	Display FLOW RATE in the upper display using the following keystroke sequence. Depress and release:
	RO	a. DISPLAY. (upper)
	RO	b. RATE 8.
	RO	Notify CTRM SRO of approximate time to add batch from Step 3.1.13 and that the batch operation is to commence.
	RO	Enable the Batch Controller by pressing RUN.
	RO	Open MU 40, BATCH ISO, using HIS MU40.

Op Test No.: 1	Scenario # 3	Event # 1	Page 6 of 25
Event Description: Controlled Power Reduction			

Time	Position	Applicant's Actions or Behavior
NOTE:		**A minimum of 25 gallons of water shall be added to the makeup tank to flush the piping following any boric acid additions to the makeup tank.**
	RO	IF boric acid is being added from a BAAT, THEN complete the following:
		a. Start the Boric Acid Pump for the BAAT lineup up to supply boric acid.
	RO	1. Boric Acid Pump 1-1 using HIS MU50A
		OR
	RO	2. Boric Acid Pump 1-2 using HIS MU50B.
	RO	b. Throttle boric acid flow with MU 23, FLOW CONTROL, HIC MU23, while observing flow indication on the upper display of the Batch Controller.
	RO	c. WHEN desired amount of boric acid has been added from the BAAT. THEN stop the boric acid pump started in Step 3.1.20.a.
	RO	d. Close MU 23, FLOW CONTROL, using HC MU23.
	RO	Open WC 3526, BOOSTER SYSTEM BYPASS, using HIS 3526.
		IF the batch operation must be stopped prior to completion, THEN perform the following:

Op Test No.: 1	Scenario # 3	Event # 1	Page 7 of 25
Event Description:	Controlled Power Reduction		

Time	Position	Applicant's Actions or Behavior
		Repeat Step 3.1.22 as necessary to complete the batch operation.
	RO	WHEN the batch is complete, THEN verify MU 40, BATCH ISO, is closed.
	RO	Close WC 3526, BOOSTER SYSTEM BYPASS, HIS 3526.
	RO	Notify the CTRM SRO the batch operation is complete.
	RO	Document the batch operation in the Unit Log and compliance with SR 4.1.1.2, if necessary.
On Lead Evaluator's discretion, proceed to Event 2		

Op Test No.: 1	Scenario # 3	Event # 2	Page 8 of 25
Event Description:	Increasing Vibration on MFPT #1 Requiring Manual Trip		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, insert command for Event 2**		
Indications Available: **10-3-A, MFP 1 or BFP 1 BEARING VIB HI** **Excessive vibration of MFP 1 Bearings** **Excessive vibration of MFPT 1 Bearings** **Excessive vibration of MFPT 1 Gear Reducer Bearings**		
	BOP	Send EO to locally monitor the MAIN FD PUMPS 1 AND 2 VIBRATION PANEL for Gear Reducer, Booster Pump, and Feed Pump vibration.
	BOP	Obtain vibration reading from ZJR 2538, MAIN TURBINE & MFP TURBINES – BEARING VIBRATION & ECCENTRICITY, points 11 and 12 for MFPT 1.
	SRO/BOP	IF vibration amplitude increases and remains above the second setpoint AND Maintenance personnel are NOT immediately available to take vibration readings, THEN trip MFPT 1 using HS 797, TURBINE TRIP.
BOOTH INSTRUCTOR:		**Report that Maintenance personnel are NOT available.**
	BOP	TRIP MFPT #1
Indications Available: **8-4-A, MFPT 1 TRIP** **4-3-E, PZR LEVEL HI** **14-3-D, ICS MFP LOSS OR LOW DEAR RUNBACK** **14-4-C, ICS RX PWR LIMITED BY FEEDWATER**		
		IF an ICS Runback occurs THEN REFER to DB-OP-06401, Integrated Control System Operating Procedure. **Runback should occur but does NOT.**

Op Test No.: 1	Scenario # 3	Event # 2	Page 9 of 25
Event Description:	Increasing Vibration on MFPT #1 Requiring Manual Trip		

Time	Position	Applicant's Actions or Behavior
	RO	Places SG/RX DEMAND H/A Station in HAND and initiates runback at 20% power per minute (See Event next page)

Op Test No.: 1 Scenario # 3 Event # 3 Page 10 of 1

Event Description: ICS AUTO Runback Fails

Time	Position	Applicant's Actions or Behavior
		Crew may refer to OP-06401 for runback.
	RO/BOP	IF the runback was caused by a feed pump trip, THEN perform the following:
	RO	IF ICS was NOT in TRACK, THEN verify ICS is or has runback at 20%/minute to 55% power. OTHERWISE place HIC ICS13, SG/RX DEMAND station in HAND AND perform the runback at 20%/minute to 55% power. (ULD DEMAND as read on DAAS=514 Mwe)
	RO	IF the pressurizer spray valve was operated, THEN verify RC2, PRESSURIZER SPRAY VALVE is in AUTO AND closed.
	RO/BOP	Perform a NIP/HBP comparison for the current power level.
	SRO	REFER to DB-OP-06902, Power Operations, for guidance to operate plant equipment for the current power level.
On Lead Evaluator's discretion, proceed to Event 4		

Op Test No.: 1	Scenario # 3	Event # 4	Page 11 of 1
Event Description:	RCS Pressure Instrument Selected for NNI Input Fails LO		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, insert command for Event 4**		
Indications Available: **5-1-G, RPS CH 1 TRIP** **5-3-G, RPS RC LO PRESS TRIP**		
	SRO	Refer to Technical Specifications 3.3.1.1, and take action as required.
	CREW	Refer to DB-OP-02513, Section 4.6.
	RO	Manually control Pressurizer Heaters as required to maintain normal RCS Pressure.
	RO	Manually control Pressurizer Spray RC 2 to maintain normal RCS pressure.
	BOP	Exchange RCS pressure input to NNI from RPS, REFER to DB-OP-06403, Reactor Protection System (RPS) and Nuclear Instrumentation (NI) Operating Procedure.
	BOP	IF exchanging the RCS PRESSURE NNI input, THEN perform the following:
		1. Place the following Pressurizer Heaters in OFF OR as directed by the Control Room SRO.
		• HIS RC2-2, Bank 2
		• HIS RC2-3, Bank 3
		• HIS RC2-4, Bank 4

Op Test No.: 1 Scenario # 3 Event # 4 Page 12 of 1

Event Description: RCS Pressure Instrument Selected for NNI Input Fails LO

Time	Position	Applicant's Actions or Behavior
		• HIS RC2A, Essen Bank 1
		• HIS RC2B, Essen Bank 2
	RO	2. IF available, THEN place PIC RC2 Bank 1 in MANUAL and maintain RCS pressure by adjusting the output.
	RO	IF RC 11 PORV BLOCK, is closed, THEN open RC 11, PORV BLOCK.
	RO	Return to normal operation.
	BOP	Remove the cap on the selection panel for the alternate RC PRESSURE NNI receptacle in RPS Channel 2.
	BOP	Disconnect the amphenol connector from the RC PRESSURE NNI subassembly and reconnect the amphenol connector to the alternate RC PRESSURE NNI Receptacle.
	BOP	Cap the open RC PRESSURE NNI receptacle.
	RO	IF desired, THEN place the following Pressurizer Heaters in the designated position:
	RO	• HIS RC2-2 Bank 2, in AUTO + BASE
	RO	• HIS RC2-3, Bank 3, in AUTO
	RO	• HIS RC2-4, Bank 4, in AUTO

Op Test No.: 1	Scenario # 3	Event # 4	Page 13 of 1
Event Description:	RCS Pressure Instrument Selected for NNI Input Fails LO		

Time	Position	Applicant's Actions or Behavior
	RO	• HIS RC2A, Essen Bank 1, in AUTO
	RO	• HIS RC2B, Essen Bank 2, in AUTO
	RO	If desired, THEN place PIC RC2 Bank 1 in AUTO.
	CREW	Circle the RPS Channel now supplying the input signal to the NNI and record the exchange of the RCS Pressure signal in the Unit Log.
On Lead Evaluator's discretion, proceed to Event 5		

Op Test No.: 1	Scenario # 3	Event # 5	Page 14 of 1
Event Description:	120VAC Inverter Alarm Actuates in the Control Room		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, insert command for Event 5**		
Indications Available: **Annunciator Alarm (1-6-A) INV YVI-YV3 TRBL**		
	SRO	Dispatch EO to inspect Essential Inverters YV1 or YV3 to determine which channel(s) caused the alarm.
	SRO	REFER to DB-OP-06319, Instrument AC System Procedure, Emergency Operations Section.
	SRO	REFER to Technical Specification:
		• 3.8.2.1 Applies
On Lead Evaluator's discretion, proceed to Event 6		

Op Test No.: 1	Scenario # 3	Event # 6	Page 15 of 1
Event Description:	OTSG Tube Leak		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, insert command for Event 6**		
Indications Available: **9-4-A, VAC SYS DISCH RAD HI** **4-4-C, HOT LEG PRESS LO** **Makeup flow rising** **PZR level lowering**		
	SRO	Dispatch an operator to the affected RE to check if a high flow or low flow condition exists by observing flow at FI 1003A and FI 1003B.
	SRO	GO to DB-OP-02531, Steam Generator Tube Leak, for guidance.
	RO	Isolate Letdown.
	RO	IF second Makeup Pump is available, THEN start the second Makeup Pump AND verify Makeup flow is rising.
		FI MU 31, MAKEUP FLOW TRAIN 2
		FI 6425, MAKEUP FLOW TRAIN 1
	CREW	Determine which SG is leaking (OTSG-1)
	CREW	Calculate a leak rate using Attachment 1, Steam Generator Tube Leak Rate Calculation. (CALC ≈ 150 gpm)
	SRO	Determine Emergency Classification. REFER to RA-EP-01500, emergency Classification.
	SRO	Notify Chemistry personnel to perform Attachment 2, Chemistry

Op Test No.: 1 Scenario # 3 Event # 6 Page 16 of 1

Event Description: OTSG Tube Leak

Time	Position	Applicant's Actions or Behavior
		Personnel Responsibilities.
	SRO	Notify Radiation Protection personnel to perform Attachment 3, Radiation Protection Personnel Responsibilities.
	SRO	Perform Attachment 4, Control of Secondary Contamination and Offsite Releases.
	SRO	Determine the appropriate actions based on the following criteria:
		IF the leak rate calculation exceeds T.S. 3.4.6.2 limits with 4 RCPs running, THEN GO TO Subsection 4.2.
	SRO	Primary to secondary leakage through each SG is limited to 150 GPD (0.104 GPM), Refer to TS 3.4.6.2.c.
	SRO	If entering this procedure due to an increasing leak rate of greater than 30 GPD in one hour AND greater than 75 GPD leakage, THEN select a shutdown rate to achieve less than 50% power within one hour AND be in mode 3 within the next 2 hours, OTHERWISE select a shutdown rate to comply with TS 3.4.6.2.
	SRO	Notify the System Control center (SCC) of the unit load reduction.
		As determined by the Unit Supervisor, reduce unit load by any of the following methods:
	RO	• At the LOAD CONTROL panel:
		1. Set the RATE OF CHANGE to a rate specified by the Unit Supervisor.

Op Test No.: 1	Scenario # 3	Event # 6	Page 17 of 1
Event Description: OTSG Tube Leak			

Time	Position	Applicant's Actions or Behavior
		2. Set the MIN LIMIT – MW to 180 Mwe.
	RO	3. Depress the DEC pushbutton to lower the unit load to the target determined by the Unit Supervisor.
On Lead Evaluator's discretion, proceed to Event 7		

Op Test No.: 1	Scenario # 3	Event # 7, 8 & 9	Page 18 of 1
Event Description:	MFPT #2 Trips; OTSG Tube Leak Rises to Rupture Following the Reactor Trip; PZR Spray Valve Fails CLOSED During Depressurization		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, insert command for Event 7**		
Indications Available: **MFPT #2 Trips** **Reactor Trip**		
	RO	Manually Trip the Reactor
	RO	Reactor Trip Pushbutton has been depressed:
		AND
		Power is decreasing on the Intermediate Range Nuclear Instrumentation
	RO	Manually trip the Turbine.
		Turbine Trip Pushbutton has been depressed
		AND
		Turbine Stop Valves 1, 2, 3 AND 4 are closed.
	SRO	Implement any necessary Specific Rules
		SG LEVEL SETPOINTS – May apply. MDFP must be started.
	SRO	Implement any necessary Symptom Mitigation Sections
		Section 8.0 STEAM GENERATOR TUBE RUPTURE – does

Op Test No.: 1 Scenario # 3 Event # 7, 8 & 9 Page 19 of 1

Event Description: MFPT #2 Trips; OTSG Tube Leak Rises to Rupture Following the Reactor Trip; PZR Spray Valve Fails CLOSED During Depressurization

Time	Position	Applicant's Actions or Behavior
		apply. SRO will route to Section 8.0, Step 8.7
CRITICAL TASK	**RO**	**IF HPI piggyback operation is NOT in service, THEN line up and start HPI piggyback operation as follows:**
		Start the standby CCW Pump.
		Start BOTH HPI Pumps
		• **HPI Pump 1**
		• **HPI Pump 2**
		Open HPI Injection Valves
		• **HP 2A**
		• **HP 2B**
		• **HP 2C**
		• **HP 2D**
		Start BOTH LPI Pumps
		• **LPI Pump 1**
		• **LPI Pump 2**

Op Test No.: 1 Scenario # 3 Event # 7, 8 & 9 Page 20 of 1

Event Description: MFPT #2 Trips; OTSG Tube Leak Rises to Rupture Following the Reactor Trip; PZR Spray Valve Fails CLOSED During Depressurization

Time	Position	Applicant's Actions or Behavior
		Open piggyback valves
		• **DH 63**
		• **DH 64**
	RO	Align the Makeup and Letdown System as follows:
	RO	Verify letdown is isolated.
	RO	Lock MU Pump suctions in the BWST position.
		• MU 3971
		• MU 6405
	RO	Verify the Standby MU Pump is running.
	RO	IF BOTH MU Pumps are running, THEN open MU 6421, CTMT ISOLATION FOR ALTERNATE INJECTION LINE.
	RO	Control MU flow using MU 6419 and MU 32.
	BOP	Verify SG levels are controlled at OR increasing the proper level using Specific Rule 4.
		• SG 1
		• SG 2

Op Test No.: 1 Scenario # 3 Event # 7, 8 & 9 Page 21 of 1

Event Description: MFPT #2 Trips; OTSG Tube Leak Rises to Rupture Following the Reactor Trip; PZR Spray Valve Fails CLOSED During Depressurization

Time	Position	Applicant's Actions or Behavior
	RO	Depressurize the RCS as follows:
		Turn off all PZR heaters.
CAUTION:		**With the SFAS Low RCS Pressure Trip blocked, the operator is responsible for initiating SFAS should the leak rate increase such that Pressurizer level OR RCS pressure can NOT be controlled.**
	CREW	IF SFAS has NOT actuated on Low RCS Pressure, AND RCS pressure decrease is being manually controlled, THEN block the SFAS Low RCS Pressure trip when the BLOCK PERMIT comes on.
	RO	Use Pressurizer Spray to reduce RCS pressure to maintain minimum adequate subcooling margin.
		Open RC 10, PZR SPRAY BLOCK Valve.
	RO	Open RC 2, PZR SPRAY Valve **(valve does NOT open).**
	SRO	IF Pressurizer Spray is NOT available OR is NOT sufficient to reduce RCS pressure THEN REFER to Step 8.14 for guidance on Depressurizing the RCS without PZR Spray.
	RO	Depressurize the RCS as follows:
	RO	Turn off all PZR Heaters.
	RO	Start the QT Circ Pump if available.
	RO	Reduce RCS pressure to close to the minimum adequate SCM curve (Fig. 1) using one of the following methods:

Op Test No.: 1 Scenario # 3 Event # 7, 8 & 9 Page 22 of 1

Event Description: MFPT #2 Trips; OTSG Tube Leak Rises to Rupture Following the Reactor Trip; PZR Spray Valve Fails CLOSED During Depressurization

Time	Position	Applicant's Actions or Behavior
		• PZR Vent Line Method
		1. Open RC239A, PZR STEAM SPACE SAMPLE VALVE
		2. Open RC 200, PZR VENT TO QT ISOLATION.
		3. Manually cycle RC 200 AND control PZR heaters to maintain RCS pressure.
		OR
		• PORV method
		1. Open RC 11, PORV Block Valve
		2. Open RC 2A, PORV
		3. Manually cycle the PORV AND control PZR heaters to maintain RCS pressure close to the minimum adequate SCM curve of Figure 1.
CAUTION:		**With the SFAS Low RCS Pressure trips blocked, the operator is responsible for initiating SFAS if the leak rate rises such that PZR level OR RCS pressure can NOT be controlled.**
	CREW	IF SFAS has NOT actuated on Low RCS Pressure, AND if the RCS pressure decrease is being manually controlled with adequate SCM THEN block the SFAS Low RCS Pressure trips when the BLOCK PERMITs come in.

Op Test No.: 1 Scenario # 3 Event # 7, 8 & 9 Page 23 of 1

Event Description: MFPT #2 Trips; OTSG Tube Leak Rises to Rupture Following the Reactor Trip; PZR Spray Valve Fails CLOSED During Depressurization

Time	Position	Applicant's Actions or Behavior
	RO	Allow HPI and MU to recover PZR level AND maintain PZR level from 80 to 120 inches by controlling HPI and MU.
	SRO	Check for entry into PTS criteria. REFER to Specific Rule 5.
	CREW	Establish a 50°F/hr cooldown rate.
	BOP	IF SFRCS has tripped the AVVs, THEN block the trip and take control as follows:
		1. Place BOTH AVV H/A Stations in HAND
		2. Reduce BOTH demands to zero.
		3. Press the AVV BLOCK pushbuttons (HIS-ICS-11D or HIS-ICS-11C).
		4. Press AUTO on HIS-ICS-11B or HIS-ICS-11A.
		5. Control SG pressure using the H/A Station.
CRITICAL TASK	**CREW**	**Depressurize the RCS down to AND maintain close to the minimum adequate subcooling margin limit during RCS cooldown.**
		WHEN RCS pressure is approximately 1000 PSIG, THEN maintain RCS pressure between 980 and 1020 PSIG.
	CREW	Block SFRCS Low Main Steam Line Pressure and High SG Level Trips when the BLOCK PERMITs come in.
	BOP	Determine which SG has the tube rupture by comparing RE

Op Test No.: 1 Scenario # 3 Event # 7, 8 & 9 Page 24 of 1

Event Description: MFPT #2 Trips; OTSG Tube Leak Rises to Rupture Following the Reactor Trip; PZR Spray Valve Fails CLOSED During Depressurization

Time	Position	Applicant's Actions or Behavior
		609 (MS Line 1) and RE 600 (MS Line 2). (OTSG-1)
CAUTION:		**A maximum cooldown rate of 235°F/Hr is permitted down to a Tave of 500°F.**
	BOP	IF the tube ruptured SG SFRCS indicated level is approaching 200 inches, THEN increase the steaming rate on the tube ruptured S/G.
		IF SG level reaches 220 inches OR an SFRCS High Level Trip occurs, THEN perform the following:
	BOP	a. Continue cooldown on the good SG by blocking and opening its AVV.
	BOP	b. Stop steaming the tube ruptured SG by performing the following:
	BOP	1. Verify the MSIV is closed
	BOP	2. Verify its AVV is closed.
	BOP	3. Block and close its AFP Steam Supply Valves
	BOP	4. Close its Aux Feedwater Line Stop Valve.
	BOP	5. Verify its Main Feedwater Stop Valve is closed.
	BOP	6. Lineup all available Auxiliary Feedwater Trains to feed the good SG.
		c. To regain the ability to steam the good SG to the condenser

Op Test No.: 1	Scenario # 3	Event # 7, 8 & 9	Page 25 of 1
Event Description:	MFPT #2 Trips; OTSG Tube Leak Rises to Rupture Following the Reactor Trip; PZR Spray Valve Fails CLOSED During Depressurization		

Time	Position	Applicant's Actions or Behavior
		perform the following:
		1. Perform Attachment 6 to override the SFRCS HI LVL TRIP on the tube ruptured SG.
		2. Open the MSIV on the good SG.
		3. Defeat the MSIV to TBV interlock to allow use of the TBV's. Defeat by pulling Fuse 14 in the rear of C5761, ICS Cabinet 1.
Scenario may be terminated when RCS depressurization is in progress and RCS subcooling is less than 35 degrees F		

Facility:	Davis-Besse	Scenario No.:	4	Op Test No.:	NRC 2005
Examiners:		Operators:			

Initial Conditions:
- 100% power, MOL
- AFPT #1 tagged OOS
- Containment Air Cooler #1 tagged OOS
- CAC #3 is aligned for Train 1

Turnover: Maintain 100% power.

Event No.	Malf. No.	Event Type*	Event Description
1		I-RO, SRO TS-SRO	SFAS Containment Pressure transmitter fails low
2	MFW-06	C-BOP, SRO	HP FW Heater Tube leak
3		N-SRO R-RO	Controlled power reduction
4	SA-02, 03	C-BOP, SRO	SAC #1 trips and SAC #2 fails to load Emergency Instrument Air Compressor fails to AUTO start.
5	AC-06	C-RO, SRO TS-SRO	Bus D1 locks out
6	RCS-02	M-ALL	Rapidly progressing RCS leak rate
7		C-RO	SFAS L3 Output Module Failure (LPIP #1 fails to start and CC-1467 fails to re-position)

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

DAVIS-BESSE 2005 NRC EXAM SIMULATOR SCENARIO 4 GENERAL DESCRIPTION

The crew will take the watch with directions to maintain 100% power.

On cue from the Lead Evaluator, a Containment Pressure transmitter will fail high. The crew should respond to alarm 5-1-B, SFAS CTMT PRESS HI CH TRIP, in accordance with DB-OP-02005, PRIMARY INSTRUMENTATION ALARM PANEL 5 ANNUNCIATORS. The SRO should enter the correct TS and direct the RO to reset the tripped bistable.

Any time after the containment pressure channel actions are complete, the Lead Evaluator can cue initiation of the HP FW Tube leak. The crew should respond in accordance with DB-OP-02013, CONDENSATE FEEDWATER ALARM PANEL 13 ANNUNCIATORS. DB-OP-02013 will direct them to DB-OP-06229, HIGH PRESSURE FEEDWATER HEATER SYSTEM OPERATION. DB-OP-06229 requires a power reduction to ≤95% prior to removing the heater from service.

After the feedwater heater is removed from service, the Lead Evaluator can cue the trip of the running Station Air Compressor (SAC). The standby SAC will fail to load and the Emergency Instrument Air Compressor (EIAC) fails to automatically start. The crew should respond in accordance with DB-OP-02009, PLANT SERVICES ALARM PANEL 9 ANNUNCIATORS and may enter DB-OP-02528, LOSS OF INSTRUMENT AIR, dependent on the magnitude of the pressure drop.

When the EIAC has been started and the plant is stabilized, the Lead Evaluator can cue loss of Vital Bus D1. The bus will trip and lockout on an electrical fault. The crew should respond in accordance with DB-OP-02001, ELECTRICAL DISTRIBUTION ALARM PANEL 1 ANNUNCIATORS, and then implement DB-OP-02521, LOSS OF AC BUS POWER SOURCES. The SRO should request assistance from electrical maintenance and enter TS 3.8.1.1. and TS 3.0.3. Electrical maintenance will report back that a malfunctioning relay caused the problem and that it can be replaced within 30 minutes.

While the crew is performing DB-OP-02521 and after the SRO has declared the TS, the Lead Evaluator can cue initiation of a progressive RCS leak. The crew should respond to indications/alarms and enter DB-OP-2522, SMALL RCS LEAKS. The SRO should direct a MANUAL reactor trip no later than PZR Level ≤100 inches. The leak will become a design basis LOCA when the reactor trip occurs. The crew should enter DB-OP-02000. Coincident with the SFAS actuation, SFAS L3 Output Module will fail requiring the crew to take compensatory actions. Among other actions, the crew will perform the following high level activities: start LPIP #1, open CC1467 - CCW FROM DH CLR 1 VLV, stop HPI Pumps, and execute the steps of DB-OP-02000, Section 10.0.

The Lead Evaluator can terminate the scenario when all high level activities have been completed and the evaluators agree the crew can be properly evaluated.

Op Test No.: 1	Scenario # 4	Event # 1	Page 3 of 19
Event Description:	SFAS Containment Pressure transmitter Fails Low		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, insert command for Event 1**		
Indications Available: **5-4-B, SFAS CTMT PRESS LO FAIL**		
	CREW	Determine if the channel is OPERABLE by performing a channel check. REFER TO DB-OP-03006, Miscellaneous Instrument Shift Check.
	SRO	REFER TO Technical Specifications 3.3.2.1, and take action as required. One (1) hour to trip bistable.
	BOP	Perform actions for an Inoperable SFAS Instrument String Trip Bistable
	SRO	Verify the Shift Manager has reviewed T.S. 3.3.2.1 and Table 3.3-3 Section 1.
	SRO	Obtain the Shift Manager's permission to trip the inoperable SFAS Instrument String Trip Bistable AND circle the channel selected.
		SFAS Channel **1** 2 3 4
	SRO	Determine the trip bistable(s) that are required to be tripped to achieve the desired results (CH 1)
	BOP	Obtain the door key for the designated SFAS cabinet.
	BOP	Depress the TEST pushbutton on the trip bistable(s) listed in Step 4.1.3 AND verify the TRIP light is ON.

Op Test No.: 1	Scenario # 4	Event # 1	Page 4 of 19
Event Description: SFAS Containment Pressure transmitter Fails Low			

Time	Position	Applicant's Actions or Behavior
	BOP	Verify the associated 1/5 lights on the output modules for all four SFAS Channels are ON.
	BOP	Verify the SFAS cabinet door is closed and locked.
	BOP	Return the SFAS door key.
On Lead Evaluator's discretion, proceed to Event 2		

Op Test No.: 1	Scenario # 4	Event # 2 & 3	Page 5 of 19
Event Description:	HP FW Heater Tube Leak; Controlled Power Reduction		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, insert command for Event 2**		
Indications Available: **13-5-E, HP FW HTR 1-5 LVL**		
	CREW	Display the appropriate computer point to determine whether a high or low level exists:
		• LAH L458, HP HEATER 1-5 HIGH LEVEL ALARM
	CREW	Direct EO to locally verify HD 271A, FW HEATER 1-5 EMERGENCY DRAIN CONTROL VALVE, is throttled.
		Direct EO to locally verify HD 271B, FW HEATER 1-5 NORMAL DRAIN CONTROL VALVE, is open.
NOTE:		**Comparison of normal drain flows may help determine if heater drain flow is abnormal. Normal drain flows at 100% power are approximately 1400 KPPH.**
	CREW	Check for tube leak in heater by monitoring for abnormally high or excessive heater draining.
		a. Compare normal drain flow computer points.
		• F450, HP FW HTR 1-5 NORM DRN FLOW (KPPH)
		• F457, HP FW HTR 2-5 NORM DRN FLOW (KPPH)
	SRO	Refer to DB-OP-06229, High Pressure Feedwater Heater System Operation.

Op Test No.: 1 Scenario # 4 Event # 2 & 3 Page 6 of 19

Event Description: HP FW Heater Tube Leak; Controlled Power Reduction

Time	Position	Applicant's Actions or Behavior
	SRO	Refers to DB-OP-06229, Section 5.0
		HPFW Heater Tube Rupture Train 1
NOTE:		**Bypassing HPFW Heaters will result in Feedwater Flow and Temperature transients including Deaerator levels. Minimizing plant power levels prior to bypassing will reduce the potential for a plant trip.**
	CREW	Initiate a plant power reduction to the following power level.
		• 95 percent – A single HPFW Train will be removed from service.
	BOP	Isolate feedwater to HPFW Heater Train 1 by simultaneously performing the following:
		• Throttle open FW 460, HP HTR TRAINS BYPASS, using HIS 460.
		• Close FW 448, HP HEATER TRAINS ISOLATION 1-4 INLET, using HIS 448.
		• Close FW 440, HP HEATER TRAINS ISOLATION 1-6 OUTLET, using HIS 440.
	BOP	Close ES 2014, EXT STM TO HP HTRS ISO TRAIN 1, using HIS 2014.
		Verify ES 252, FEEDWATER HEATER – EXT STM LINE DRAINS TRAIN 1, 1-6, is open, using HIS 252.
	BOP	Direct EO to locally isolate HPFW Heater Train 1 by performing

Op Test No.: 1 Scenario # 4 Event # 2 & 3 Page 7 of 19

Event Description: HP FW Heater Tube Leak; Controlled Power Reduction

Time	Position	Applicant's Actions or Behavior
		Attachment 10, Isolation of Feedwater Heater Train 1.
NOTE:		**The reliefs for the HPFW Heaters relieve to the TPCW Low Level Tank. This may result in elevated TPCW temperatures and levels.**
	CREW	Monitor TPCW System performance. REFER TO DB-OP-06263, turbine Plant Cooling Water system, as necessary.
	BOP	Throttle FW 460, HPFW HEATERS FW BYPASS VALVE, using HIS 460 as necessary to maintain Train 2 flow, as read on FI 581, HPFW HTR GROUP 2 FW FLOW, approximately one half the total Feedwater flow.
On Lead Evaluator's discretion, proceed to Event 4		

Op Test No.: 1	Scenario # 4	Event # 4	Page 8 of 19
Event Description:	SAC #1 Trips and SAC #2 Fails to Load; Emergency Instrument Air Compressor Fails to AUTO Start		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
When directed, insert command for Event 4		
Indications Available:		
9-2-E, STA AIR CMPRSR 2 TRBL/TRIP		
9-3-E, STA AIR HDR PRESS LO		
9-1-F, INSTR AIR HDR PRESS LO		
	CREW	Determine if SAC 2 has tripped by checking indicating lights at Control Room Switch HIS 1494, STATION 2 AIR COMPRESSOR.
	CREW	IF SAC 2 has tripped, THEN perform the following:
	BOP	Verify that the Standby Air Compressor SAC 1 has started and loaded. REFER TO DB-OP-06251, Station and Instrument Air System.
	BOP	Manually start the EIAC by taking HIS 813, EMER INSTR AIR COMPRESSOR to START position.
NOTE:	**The Crew may refer to DB-OP-2528, Loss of Instrument air, to perform these actions.**	
On Lead Evaluator's discretion, proceed to Event 5		

Op Test No.: 1	Scenario # 4	Event # 5	Page 9 of 19
Event Description:	Bus D1 Locks Out		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, insert command for Event 5**		
Indications Available: **Room goes dark** **Multiple annunciators on Panels 1 and 2**		
	CREW	Determine which AC Bus(es) are lost. (D1, D2)
	SRO	Refer to Attachment 14, Loss of AC Busses LCO Tracking Aid. T.S. 3.0.3 applies.
	RO	Verify Makeup Pump 2 breaker is open – HIS MU 24B, MAKEUP PUMP 2
	CREW	IF Bus D1 remains deenergized, THEN perform Attachment 7, Energizing Bus D1.
	CREW	Based on the bus(es) lost, review E-1040A, electrical Distribution Manual to determine what loads have been lost.
	CREW	Take actions to address loads that have been lost. Refer to applicable procedures.
		• Abnormal Procedures
		• Alarm Procedures
		• System Operating Procedures
	NOTE	Loss of power to the battery chargers supplying DC MCC 1 or 2 will result in battery depletion and eventual loss of the DC MCC unless the DC MCCs are cross connected or power is restored

Op Test No.: 1 Scenario # 4 Event # 5 Page 10 of 19

Event Description: Bus D1 Locks Out

Time	Position	Applicant's Actions or Behavior
		to the battery chargers.
NOTE:		**The Crew may re-energize Bus D-1 by performing Attachment 7, Section 1.0, to close AD-110, or Section 4.0, to start EDG 2 and energize Bus D-1.**
	CREW	Refer to DB-OP-02512, Loss of RCS Makeup.
	RO	Verify Components Cooling Water supply to the RCP's.
		CCW to CTMT on Panel C5717
		CC1411A – OPEN
		CC1411B – OPEN
		CCW FROM CTMT on Panel C5717
		CC 1407A – OPEN
		CC 1407B – OPEN
		Seal Cooling CCW Return on Panel C5718
		RCP 1-1 CC4100 – OPEN
		RCP 1-2 CC4200 – OPEN
		RCP 2-1 CC4300 – OPEN

Op Test No.: 1 Scenario # 4 Event # 5 Page 11 of 19

Event Description: Bus D1 Locks Out

Time	Position	Applicant's Actions or Behavior
		RCP 2-2 CC4400 – OPEN
		Annunciator alarm (6-5-B) SEAL CCW FLOW LO is extinguished.
	RO	Isolate letdown by closing – HIS MU2B, LETDOWN ISO MU2B HIS MU3, LETDOWN CLRS OUTLET
	RO	Isolate Seal Injection by closing MU 19 by closing – FIC MU19, RCP SEAL INJECTION FLOW CONTROL
	RO	Isolate normal Makeup by closing MU 32 – LIC RC14, PRESSURIZER LEVEL CONTROL.
	CREW	REFER TO DB-OP-02515, Reactor Coolant Pump and Motor Abnormal Operation, for RCP operation with a loss of Seal Injection water to an RCP.
	RO	Maintain Tave constant.
	RO	Start the standby Makeup Pump.
	RO	• Restore Seal Injection flow as follows:
		1. As soon as Makeup and MU 19 become available, gradually (over ~ 2 minutes) open MU 19 to a setpoint of 12-15 gpm (~3 gpm pcr RCP).
		2. After 10 minutes and as the time permits increase total seal injection flow to ~20-25 gpm (~6 gpm per RCP).
		3. After another 10 minutes and as time permits adjust total seal injection flow to the normal range.

Op Test No.: 1 Scenario # 4 Event # 5 Page 12 of 19

Event Description: Bus D1 Locks Out

Time	Position	Applicant's Actions or Behavior
		4. Return MU 19 to AUTO.
	RO	• Restore Makeup Flow as follows:
		1. Slowly raise MU flow using MU 32.
		2. WHEN PZR level is correct for the existing Tave in accordance with Curve CC 4.3, Minimum Pressurizer Level vs. RC Temperature, of DB-PF-06703, Miscellaneous Operations Curves. THEN return MU 32 to AUTO.
	RO	• Restore Letdown.
		1. HIS MU2B, LETDOWN ISO MU 2B
		2. HIS MU3, LETDOWN CLRS OUTLET
	SRO	REFER TO TS 3.1.2.4.
	SRO	GO TO DB-OP-00000, Conduct of Operations.
	NOTE	DB-OP-00000, conduct of Operations, contains instructions on returning to normal operation following abnormal operation.
On Lead Evaluator's discretion, proceed to Event 6		

Op Test No.: 1	Scenario # 5	Event # 6 & 7	Page 13 of 19
Event Description:	Rapidly Progressing RCS Leak Rate; SFAS L3 Output Module Failure (LPIP #1 Fails to Start and CC-1467 Fails to Re-Position)		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: **When directed, insert command for Event 6**		
Indications Available: **Pressurizer level rapidly lowering** **RCS pressure rapidly lowering**		
	CREW	Should determine that reactor should be tripped.
	SRO	Directs crew to manually trip the Reactor.
	RO	Reactor Trip Pushbutton has been depressed;
		AND
		Power is decreasing on the Intermediate Range Nuclear Instrumentation.
	RO	Manually trip the turbine.
		Turbine Trip Pushbutton has been depressed.
		AND
		Turbine Stop Valves 1, 2, 3 AND 4 are closed.
		OR
		Turbine control Valves 1, 2, 3 AND 4 are closed.

Op Test No.: 1 Scenario # 5 Event # 6 & 7 Page 14 of 19

Event Description: Rapidly Progressing RCS Leak Rate; SFAS L3 Output Module Failure (LPIP #1 Fails to Start and CC-1467 Fails to Re-Position)

Time	Position	Applicant's Actions or Behavior
	SRO	Implement any necessary Specific Rules.
	SRO	Applies ACTIONS FOR LOSS OF SUBCOOLING MARGIN Specific Rule 2
CRITICAL TASK	**RO**	**Trip All Reactor Coolant Pumps**
	RO	• **RCP 1-1**
	RO	• **RCP 1-2**
	RO	• **RCP 2-1**
	RO	• **RCP 2-2**
	SRO	Routes to DB-OP-02000, section 5.0, Lack of Adequate Subcooling Margin
	RO	Trip all RCPs (Rule 2 may have already tripped.)
	RO	Verify BOTH HPI Trains are in service as follows:
	RO	Verify BOTH CCW Trains are in service to supply essential cooling:
		• CCW Train 1 **(may manually open CC-1467 at this time)**
		• CCW Train 2

Op Test No.: 1 Scenario # 5 Event # 6 & 7 Page 15 of 19

Event Description: Rapidly Progressing RCS Leak Rate; SFAS L3 Output Module Failure (LPIP #1 Fails to Start and CC-1467 Fails to Re-Position)

Time	Position	Applicant's Actions or Behavior
	RO	Verify BOTH HPI Pumps are running.
		• HPI Pump 1
		• HPI Pump 2
	RO	Verify HPI Injection Valves fully open.
		• HP 2A
		• HP 2B
		• HP 2C
		• HP 2D
	RO	Lineup Makeup System as follows:
		Lock MU Pump Suction in the BWST position.
		• MU 3971
		• MU 6405
	RO	Start the second MU Pump.
		Start BOTH LPI Pumps

Op Test No.: 1 Scenario # 5 Event # 6 & 7 Page 16 of 19

Event Description: Rapidly Progressing RCS Leak Rate; SFAS L3 Output Module Failure (LPIP #1 Fails to Start and CC-1467 Fails to Re-Position)

Time	Position	Applicant's Actions or Behavior
Critical Task	**RO**	• **LPI Pump 1 (must manually start)**
		• LPI Pump 2 (Tripped)
	RO	Open MU 6420, MU 32 BYPASS.
	RO	Verify MU 6422, MU CTMT ISOLATION is open.
	RO	Verify proper SFAS response**. (Align CC-1467 if NOT already performed.)**
	BOP	Verify proper SFRCS actuation for the trip parameters present using Table 1.
	BOP	Verify proper SG level control by AFW using Specific Rule 4.
	SRO	IF RCS pressure lowers to the point where LPI flow is observed, THEN GO TO Section 10, Large LOCA.
		SRO routes to Section 10.
	SRO	Check RA-EP-01500, Emergency classification, to determine if emergency action levels have been exceeded. Proceed with Emergency Plan activities in parallel with operational activities.
	CREW	Verify proper SFAS response using Table 2.

Op Test No.: 1 Scenario # 5 Event # 6 & 7 Page 17 of 19

Event Description: Rapidly Progressing RCS Leak Rate; SFAS L3 Output Module Failure (LPIP #1 Fails to Start and CC-1467 Fails to Re-Position)

Time	Position	Applicant's Actions or Behavior
	CREW	Perform actions to close breakers for DH 7A, DH 7B, DH 9A, DH 9B and HP 31. REFER TO Attachment 7, Section 1, Actions to close breakers for DH 7A, DH 7B, DH 9A, DH 9B and HP 31.
	RO	IF LPI flow into the RCS exists, THEN perform the following:
		Stop BOTH Makeup Pumps
		• Makeup Pump 1
		• Makeup Pump 2
	RO	IF LPI Pump Suctions are aligned to the BWST THEN verify BOTH piggyback valves are closed.
		• DH 63
		• DH 64
	RO/BOP	Start Control Room EVS as follows:
		Start BOTH Control Room EVS Fans.
		• Place HIS 5261, CONTROL ROOM EMER VENT FAN, 1 in start.
		• Place HIS 5262, CONTROL ROOM EMER VENT FAN, 2 in start.

Op Test No.: 1 Scenario # 5 Event # 6 & 7 Page 18 of 19

Event Description: Rapidly Progressing RCS Leak Rate; SFAS L3 Output Module Failure (LPIP #1 Fails to Start and CC-1467 Fails to Re-Position)

Time	Position	Applicant's Actions or Behavior
	RO/BOP	For each Control Room EVS fan that has been started, perform the following:
		a. Open the outside air Inlet damper(s):
		• HA 5261A, FAN 1 OUTSIDE AIR INLET DAMPER
		• HA 5262A, FAN 2 OUTSIDE AIR INLET DAMPER
		b. Verify the process radiation monitor(s) in operation:
		• RCM-5327, CTRM FLT FAN 1 DISCH
		• RCM-5328, CTRM FLT FAN 2 DISCH
	RO/BOP	c. IF accessible, THEN place the Air Cooled Condensing Units) in service e following Emergency Start. REFER to DB-OP-06505, control Room Emergency Ventilation System Procedure.
	RO	IF only DH Pump 1 is available, THEN cross-connect DH Pump discharges as follows:
		a. Verify DH Pump 2 is off.
		b. Block AND close DH 2734, DH PUMP 2 LPI SUCT.
		c. Close DH 1A.
		d. WHEN DH 2734 is closed, THEN open DH 831, DECAY HEAT COOLER DISCH XOVER 1 TO 2

Op Test No.: 1 Scenario # 5 Event # 6 & 7 Page 19 of 19

Event Description: Rapidly Progressing RCS Leak Rate; SFAS L3 Output Module Failure (LPIP #1 Fails to Start and CC-1467 Fails to Re-Position)

Time	Position	Applicant's Actions or Behavior
	RO	Throttle closed DH 1B AND throttle open DH 1A to obtain the following:
	RO	• Maximize total DH Pump 1 flow NOT to exceed 4000 gpm.
	RO	• Balance flow between DH Injection Lines, FY1 DH2B AND FYI DH2A
	RO	• Do NOT throttle either LPI line to less than 1350 gpm, FYI DH2B OR FYI DH2A
	RO	• Continue to monitor and adjust total DH Pump 1 flow as necessary.
Scenario may be terminated when LPI is cross-connected.		